Technical Disclosure Commons

Defensive Publications Series

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DEVICE FOR STOWING AWAY AN ACTUATING DEVICE - REDUNDANT CONTROL

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Technical task:
Today's adjustable pedal systems in motor vehicles have the purpose of improving operability. During highly automated driving, when the vehicle has taken over the driving task independently, it is desirable that the passenger has maximum freedom of movement on the "driver's side". For this purpose, movable control units such as the steering wheel and foot lever mechanism have been developed.
The pedals are designed in such a way that they can be moved out of the footwell during automated driving.

Depending on the type of highly automated driving (henceforth called main function), manual driving serves as a fallback level if the automated driving system has to be switched off/off, e.g. due to a fault or because the vehicle leaves the intended domain (e.g. motorway).

Today's known adjustable pedal assemblies (FHW) have a FHW control unit for control and a simple non-redundant power supply and non-redundant networking.

Initial situation:
A control unit used for control alone does not meet the availability requirements of the main function. If the control unit fails during automated operation, the vehicle may have to be brought to a standstill by the main function because the driver fails as the fallback level. This can lead to dangerous situations (e.g. parking on the hard shoulder) or severely restrict the main function (domain, speed, level classification...).

Solution:
The control of the adjustment mechanism should be redundant, i.e. two control units (1. main control unit and 2. host control unit) should acquire the input signals, perform the calculations, output the output signals to the bus systems and carry out the power control. For reasons of availability, further technical measures are usually required, such as the connection of both control units to different vehicle electrical systems (E1 and E2) and different BUS systems (N1, N2), possibly at different locations (due to water ingress, EMC, etc.), so that a simple cause cannot endanger the function.

As an option, the redundant control unit can operate with reduced power (reduced networking, low electrical power, lower computer capacity...) and be designed to be more cost-effective.

As the stowable foot lever mechanism is usually combined with a stowable steering wheel, both control units can serve as redundancy for each other. This is advantageous for cost reasons (component costs and development costs, since both control units have already been developed for high availability requirements). For availability reasons, further technical measures are also required here, such as connection to different on-board networks, different BUS systems, so that a simple fault does not endanger the function.

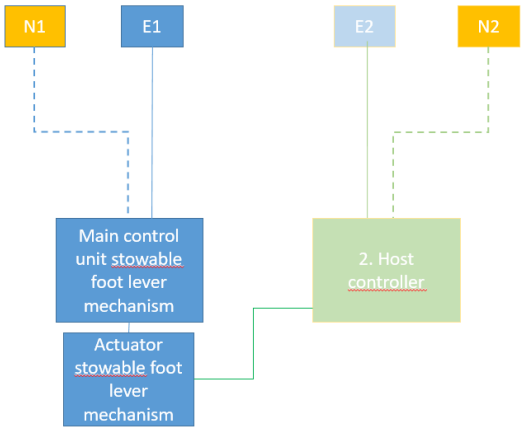

Figure 1: 2. Host control unit

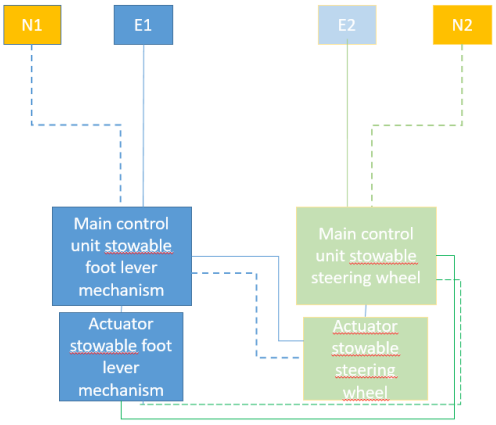

Figure 2: 2. Host control unit = steering control unit

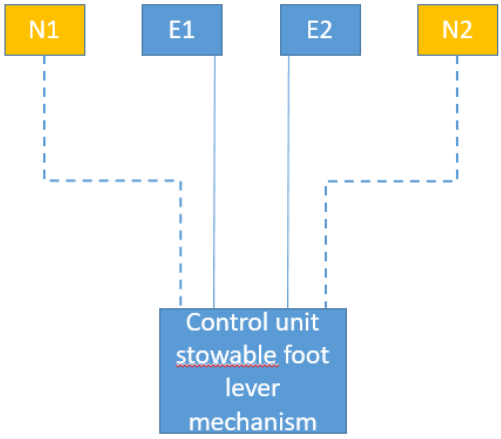

Figure 3: Redundant power supply, redundant networking

Advantages:

- The availability of the relapse life is increased.
- The main function can be guaranteed for longer.
- The main function does not have to be restricted.